

2014 Science Program Review: Stock Assessment Process

Southwest Fisheries Science Center
28 July – 1 Aug 2014
Cisco Werner
<http://swfsc.noaa.gov>

Photo: Octavio Aburto

Introductions: Review Panel

Anne Hollowed, Senior Scientist, Leader of the Status of Stocks and Multispecies Assessment Program, Alaska Fisheries Science Center, NOAA Fisheries

Dan Howard (Chair), Sanctuary Superintendent, Cordell Bank National Marine Sanctuary, NOAA Ocean Service

Steve Murawski, Betzer Professor, College of Marine Science, University of South Florida and former NMFS Chief Science Advisor

Samuel Pooley, Director, Pacific Islands Fisheries Science Center, NOAA Fisheries

Jake Schweigert, CPS Biologist, Pacific Biological Station, Department of Fisheries and Oceans (DFO) Canada, retired

Nathan Taylor, Conservation Biology Section Head, Pacific Biological Station, Department of Fisheries and Oceans (DFO) Canada

Introductions

Rick Methot, NMFS Senior Scientist for Stock Assessments

John DeVore, Staff Officer, Scientific and Statistical Committee and Groundfish,
Pacific Fisheries Management Council

Mark Helvey, Leader, Highly Migratory Species Program, WCRO

Kristen Koch, Deputy Director, SWFSC

Mark Strom, Deputy Director, NWFSC

Sarah Shoffler, Assessment Planning and Communication

Dale Sweetnam, Director (Acting), Fisheries Resources Division, SWFSC

Suzy Kohin, Deputy Director (Acting), Fisheries Resources Division, SWFSC

Steve Lindley, Director, Fisheries Ecology Division, SWFSC

Toby Garfield, Director, Environmental Research Division, SWFSC

CPS: **Kevin Hill, Paul Crone** Fisheries Resources Division, SWFSC

HMS: **Steve Teo, Kevin Piner, Tim Sippel**, Fisheries Resources Division, SWFSC

Groundfish: **John Field, E.J. Dick**, Fisheries Ecology Division, SWFSC

Stock Assessment Process Review

Are we doing good science?

Are we doing the right science?

Goals: To provide advice on improving the quality, relevance and performance of SWFSC stock assessments:

- Focus on modeling and assessment practices (including timeliness and communication)
- Comments on prioritization and peer review process
- Comments on SWFSC organization to support stock assessment



Why Program Reviews, Why Now?

- Part of a national strategic planning approach by NOAA Fisheries
- Beginning in Jan 2013, NOAA Fisheries is conducting a systematic review of fisheries programs
- Peer reviews ensure delivery of high quality, trusted, timely science supporting sustainable and profitable U.S. commercial and recreational fisheries



Structure of the Review

- Overview of SWFSC
- Overview of Assessment Process
- Scientific and Technical Process
- Peer Review Process
- Accomplishments Relative to our Mandates
- Communication
- Opportunities



Context for this Review

Background on the scope of the science at the SWFSC

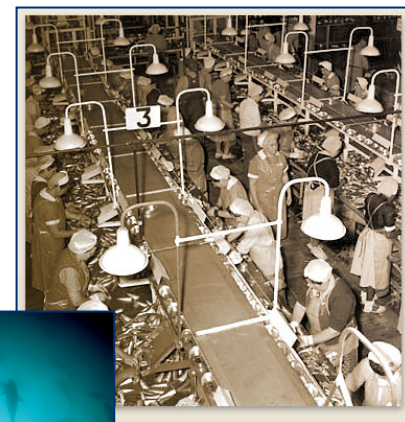


Southwest Fisheries Science Center

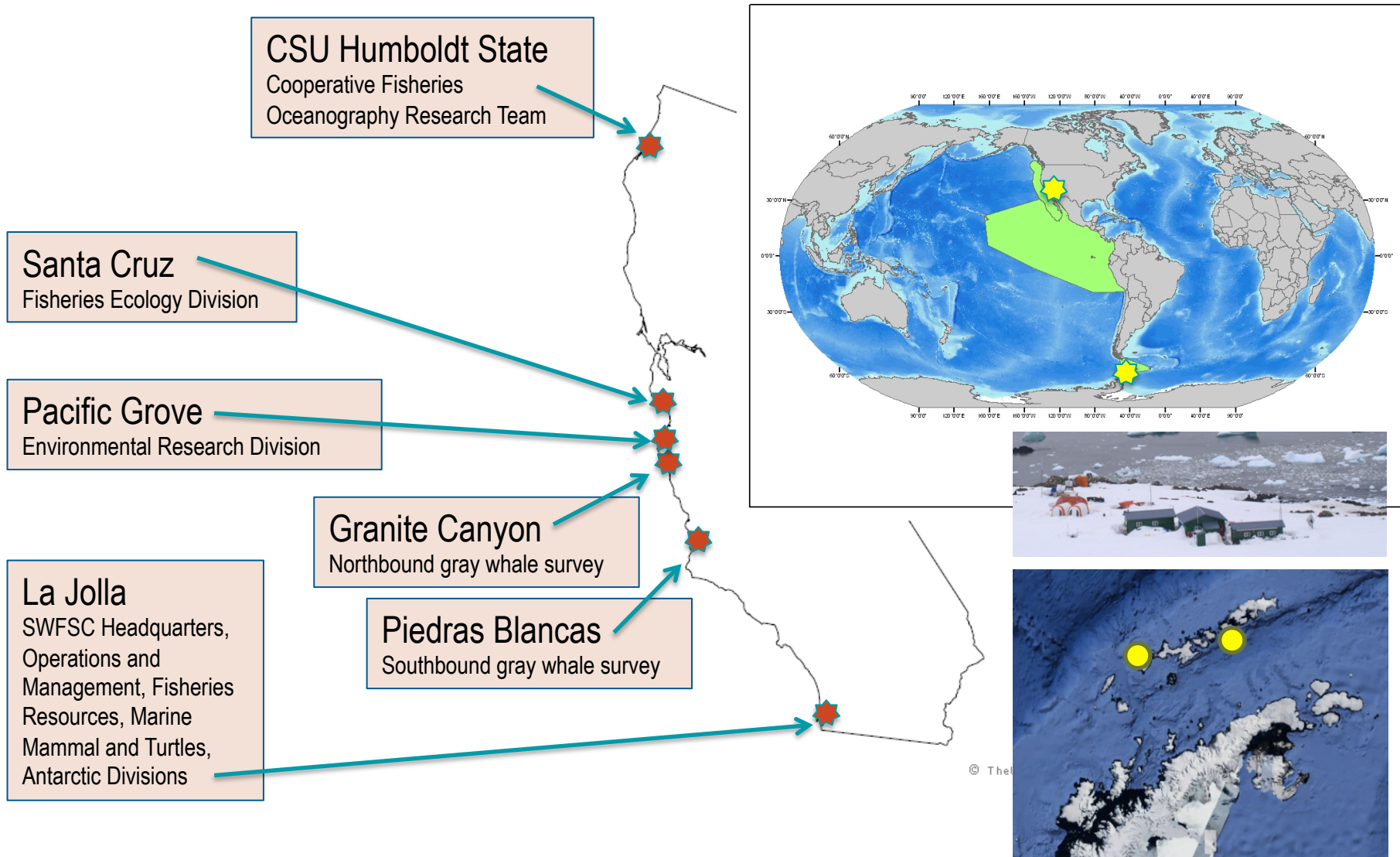
The early years: Established in 1964 to understand the impacts of the fishery on sardines and studies of tunas and tuna fishing in eastern Pacific

Today's mission: The SWFSC generates the science necessary to support the conservation and management of the region's living marine resources

Responsibilities: Responsibilities include maintaining healthy fish stocks for commercial, recreational and subsistence fishing; conserving and recovering populations of protected species; sustaining ecosystem services; and coordinating with domestic and international organizations to implement and monitor fishery agreements and treaties



Locations and geographic scope



Facilities

La Jolla



Pacific Grove



Santa Cruz



Field Sites

Arcata (CSU - Humboldt)

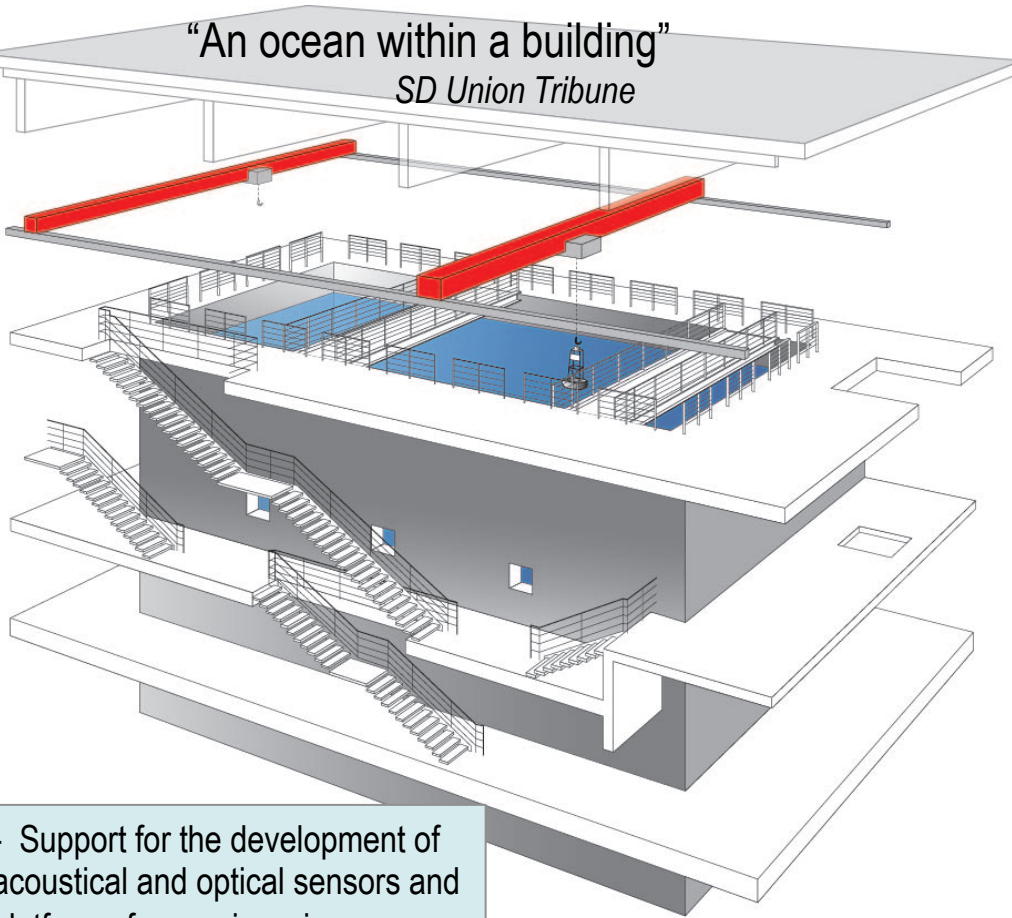
Granite Canyon

Piedras Blancas

Antarctic Peninsula

Ocean Technology Development Test Tank

"An ocean within a building"
SD Union Tribune



- Support for the development of acoustical and optical sensors and platforms for non-invasive surveys
- More efficient use of ship time
- Buoys, gliders and the development of methods to survey remotely

NOAA Ship *Reuben Lasker* Commissioned May 2014



- Acoustic and net surveys
- Marine mammal and seabird surveys
- Oceanographic and meteorological sampling
- Habitat mapping
- Sampling technology development

Key Legislative Mandates

Magnuson-Stevens Fishery Management Reauthorization Act (MSRA)

Marine Mammal Protection Act (MMPA)

Endangered Species Act (ESA)

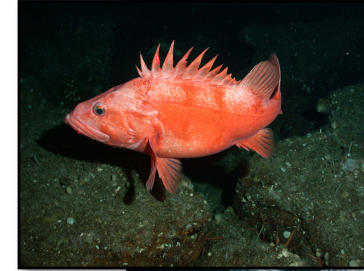
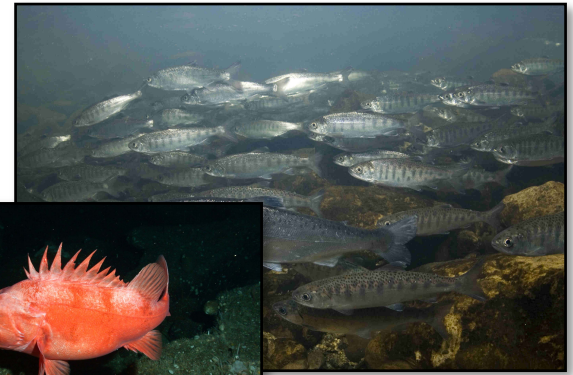
International Agreements (**IATTC**, **ISC**, **WCPFC**, IWC, CCAMLR, ...)

... and numerous other legislative and regulatory requirements



Programs and Drivers

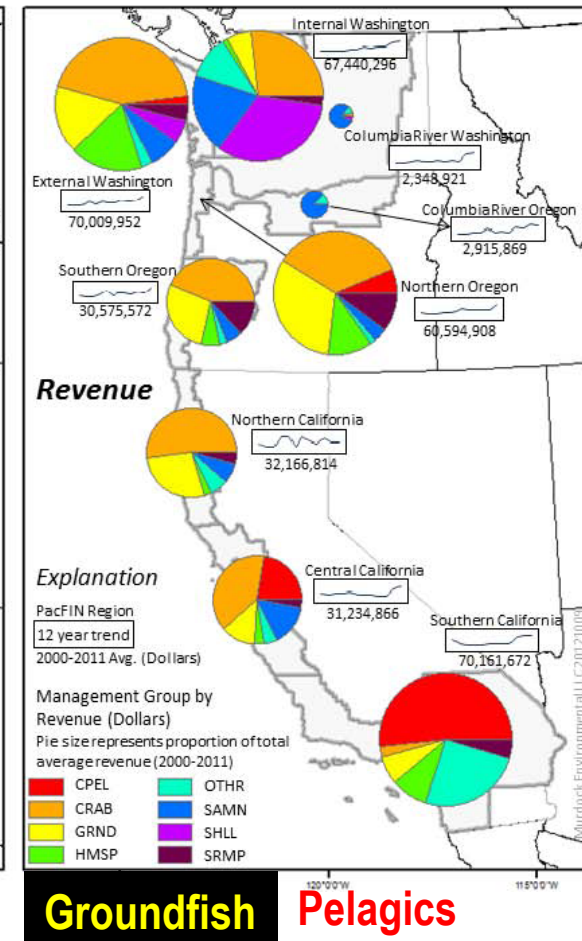
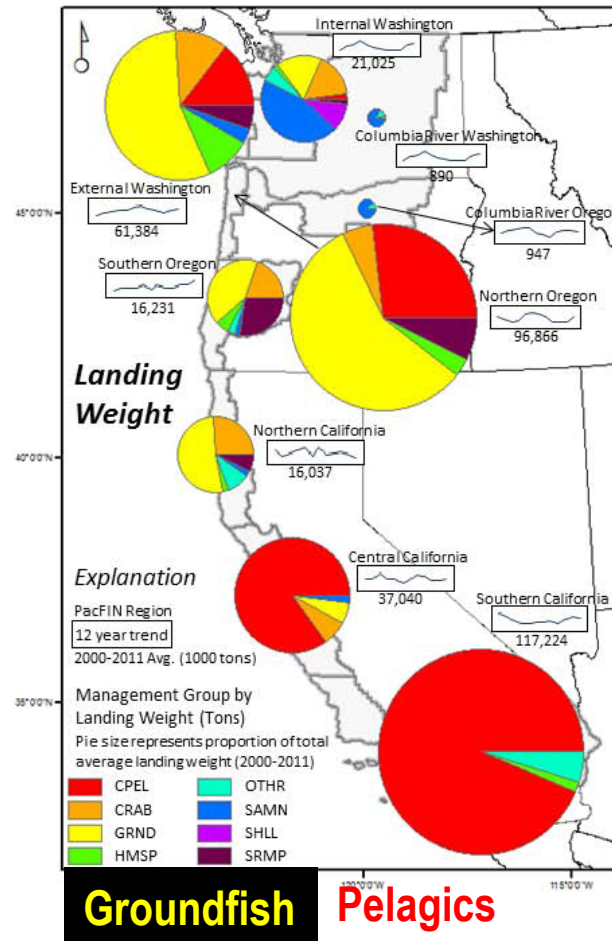
- **Coastal Pelagic Species - MSRA**
Pacific sardine, anchovy, Pacific mackerel, market squid
- **Highly Migratory Species - MSRA, ISC, IATTC, WCPFC**
Albacore tuna, bluefin tuna, billfish, sharks
- **Demersal Species - MSRA**
Rockfishes and other groundfish species (*Sebastes* sp.)
- **Anadromous Species - ESA**
Chinook salmon, coho salmon, steelhead, green sturgeon
- **Abalone - ESA**
White, black
- **Marine Mammals - MMPA, ESA, IWC, IDCPA**
Dolphins, whales, pinnipeds
- **Marine Turtles – ESA**
Leatherback turtles, green turtles
- **Antarctic Ecosystem – CCAMLR**
Krill, fish, fur Seals, Seabirds
- **Technology Development – All**
Acoustics, ROVs, AUVs, Genetics, Photogrammetry
- **Integrated Ecosystem Assessments – All**



West Coast Commercial Fisheries: Landings and Revenue

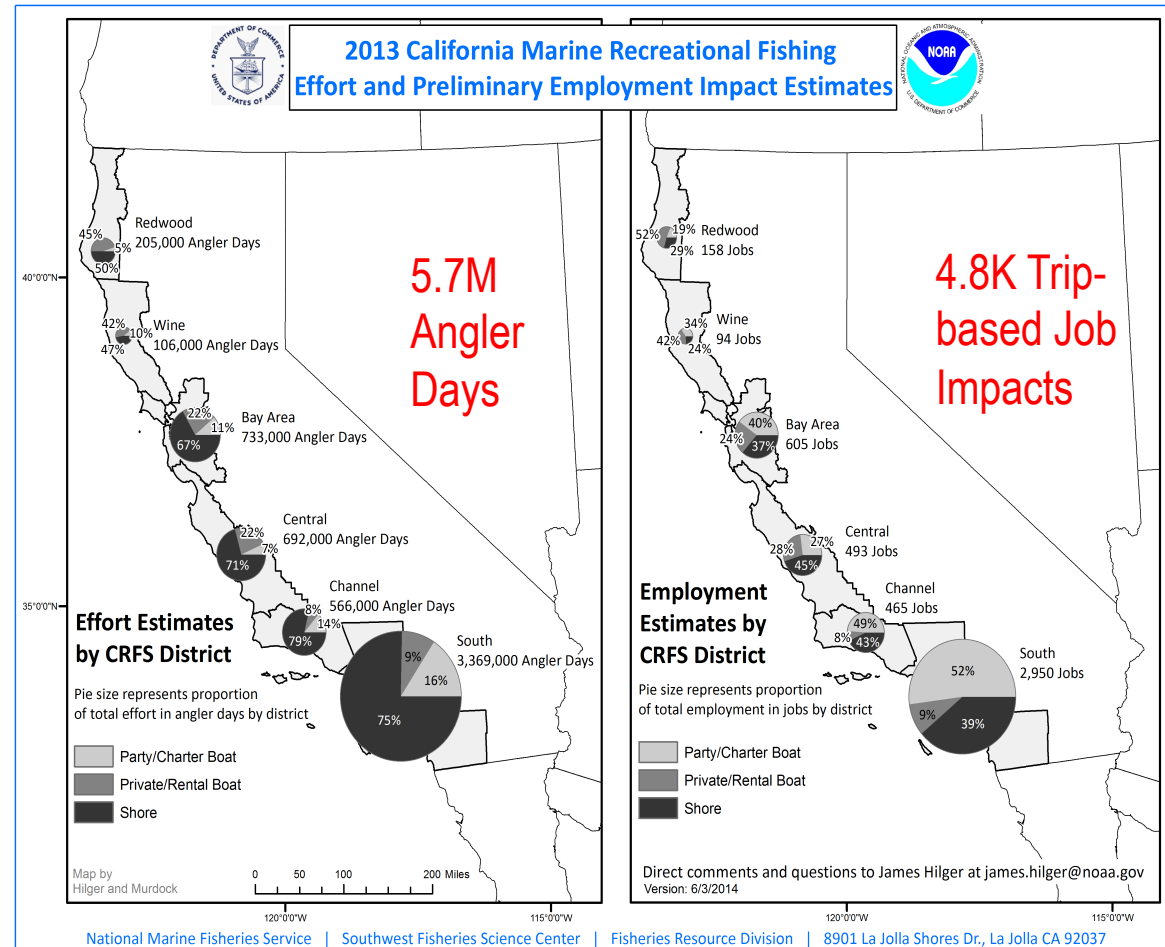
California commercial and recreational saltwater fishing generated more than \$25 billion in sales in 2012, a gain of over 19% over the previous year, with the economic impact of fishing jobs increasing 19% from 2011-2012

- Commercial fisheries are diverse and robust; landings in CA were the 5th largest by volume in the nation
- Manage for revenues and landings
- Because species are widely distributed, research conducted regionally is important to the economies of the entire U.S. West Coast



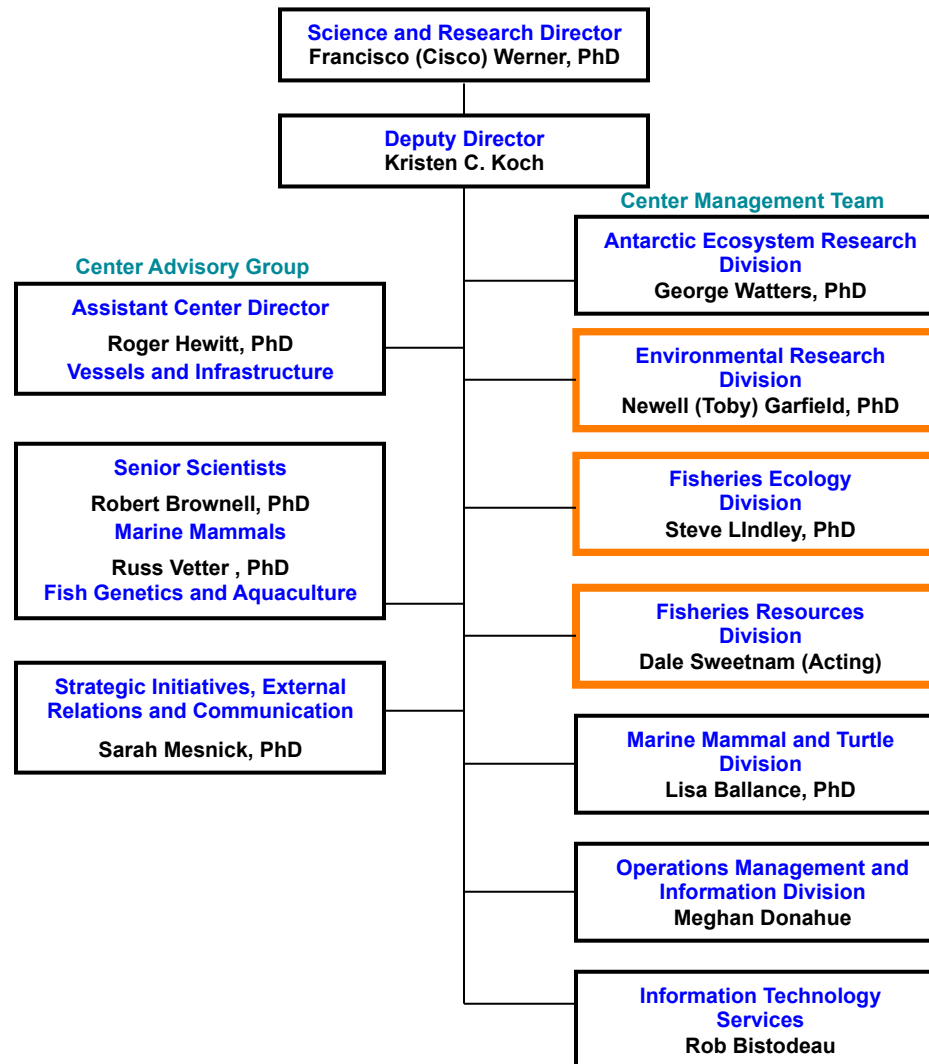
California Recreational Fisheries: Effort and Employment Impact

- Recreational fisheries are important to CA and nationally for jobs, income and value to the public
- Relies on a diversity of species, including HMS, groundfish, salmon and CPS (as bait)
- SWFSC conducts important collaborative research and data collection with the recreational fishing industry
- SWFSC assessments focus on high value species targeted by vessel based recreational fishing



8K Durable Goods Job Impacts (2012)

Organizational Structure



Also at our facilities:

NOAA's National
Environmental Satellite,
Data and Information
Service

CoastWatch

NOAA's National Ocean
Service,
**Monterey Bay National
Sanctuary**

NOAA's National Marine
Fisheries Service,
**Pacific Islands Fisheries
Science Center**

**UCSC's Center for Stock
Assessment Research**

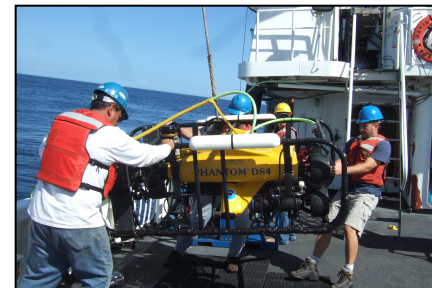
**California Department of
Fish and Wildlife**

**Inter-American Tropical
Tuna Commission**

**UC Davis Marine
Pollution Laboratory**

SWFSC Staffing FY14

| DIVISION | FEDERAL | NON-FEDERAL | TOTAL |
|----------------------------------------|---------|-------------|-------|
| Director's Office | 7 | 0 | 7 |
| Operations, Management and Information | 27 | 3 | 30 |
| Fisheries Resources Division | 39 | 40 | 79 |
| Fisheries Ecology Division | 53 | 67 | 120 |
| Marine Mammal and Turtle Division | 51 | 19 | 70 |
| Environmental Resources Division | 11 | 1 | 12 |
| Antarctic Ecosystem Research Division | 10 | 4 | 14 |



FY14 Budget

| PROGRAM | BUDGET |
|-------------------------------------------------------------------------------------------------------------------------------------|--------------|
| FISHERIES: Surveys, Assessments, Oceanography, Socioeconomics, Ecology, Life History, CalCOFI, Sample Collection and Archive | \$18,376,574 |
| MARINE MAMMALS AND SEA TURTLES: Surveys, Assessments, Oceanography, Ecology, Health and Life History, Sample Collection and Archive | \$6,683,281 |
| ANTARCTIC MARINE LIVING RESOURCES | \$3,264,748 |
| CENTER OPERATIONS: Director's Office, Operations, Management and Information (4 Laboratories) | \$8,501,350 |
| TOTAL | \$36,825,953 |

Science and Management of CPS, HMS and Groundfish (partial list)

Domestic CPS, HMS and Groundfish

- Pacific Fishery Management Council
 - Collaborate to set stock assessment priorities
 - STAR panels (review process)
- SWFSC, NWFSC and WCRO
 - Fishery independent and fishery dependent data, stock assessments and regulatory framework
- Pacific States Marine Fish Commission
 - Coordinates fishery dependent data

International HMS (with PIFSC) and CPS

- Western Central Pacific Fishery Commission / Northern Committee / ISC
 - Collaborative multi-national stock assessments for temperate HMS stocks
- Inter-American Tropical Tuna Commission
 - Staff-produced assessments for tropical and temperate HMS stocks
- Tri-national Sardine Forum
 - Collaborative science forum

Fishery Stakeholders and Partners (partial list)

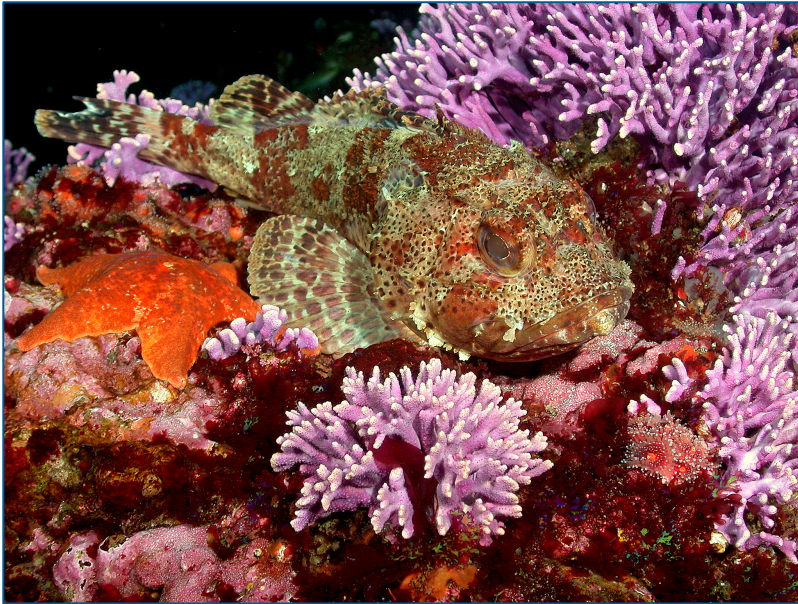
- University of California
 - Scripps Institution of Oceanography, UCSD:
 - California Cooperative Fisheries Investigations (CalCOFI)
 - Cooperative Institute for Marine Ecosystems and Climate (CIIMEC)
 - Center for the Advancement of Population Assessment Methodology (CAPAM)
 - UCSC: Center for Stock Assessment Research (CSTAR)
- Humboldt State University
- Commercial fishing industries
- Recreational fishing industries
- Seafood industry
- Recreational ocean users
- Conservation groups
- Public



SWFSC's Strategic Planning

2013: Strategic Plan

2014-15: Annual Guidance Memorandum



Planning documents support priorities laid out in the NMFS and NOAA Strategic Plans

SWFSC Strategic Plan Themes

- **Population Assessment**

Provide assessments and management advice to rebuild fisheries, fishing communities, protected species and their ecosystems

- **Ecosystem Analysis**

Assess and predict environmental change and human activity impacts on ecosystems; Design and implement new management paradigms

- **Observations, Measurements and Surveys**

Provide information and data to support assessments and ecosystem analyses

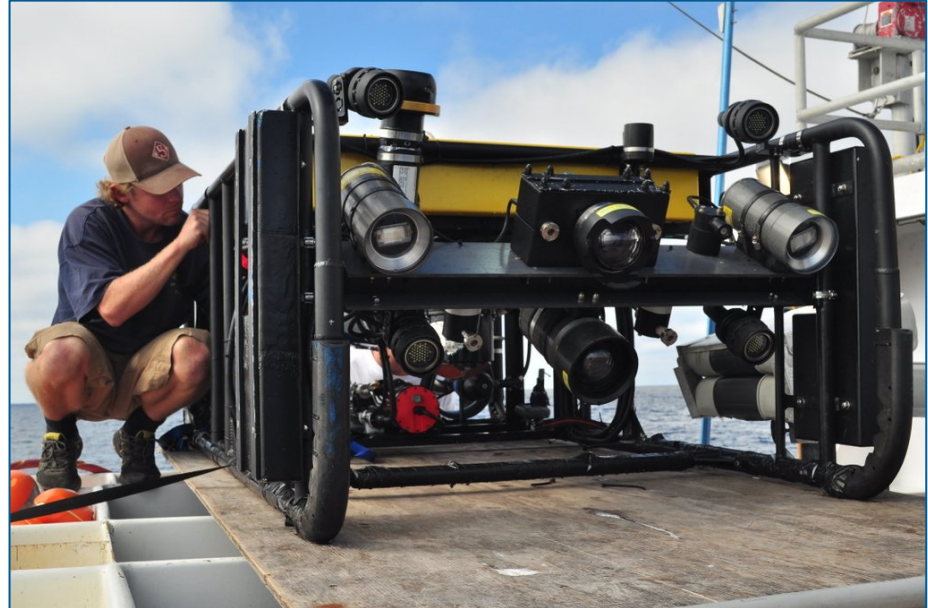
- **Technological Innovation and Development**

Improve ecosystem observations and survey methodologies through advanced technologies and sensor development

SWFSC Director's Guidance for FY14-15

Three Focus Areas:

- 1) CA Current Ecosystem Monitoring
- 2) Ecosystem Science
- 3) Ocean Technologies Development Tank, Aquaria, Laboratories and Field Sampling Innovation



Science Program Review: Data Supporting Stock Assessments

July 29-August 1, 2013

Summary of Panel's Recommendations and Center's Responses

The objective of the review was to determine if the Center is collecting the right types and amounts of information for fishery assessments, and to learn how we can improve the collection and compilation of this information.

Overview

The review focused on data used in a representative coastal pelagic species (CPS) stock assessment, Pacific sardine, as well as three representative highly migratory species (HMS) stock assessments: north Pacific albacore, swordfish and blue sharks:

- Much of the data used in our HMS stock assessments are fishery data, i.e., information collected by logbooks
- CPS stock assessments rely heavily on both fishery-dependent and survey (fishery independent) data
- We provided background information on all data sources as well as the role of habitat and oceanographic data

Our efforts in the collection of groundfish data were presented jointly with the NWFSC's review

Panel recommendations and responses

Modernize existing databases

- We have started implementing a plan for migrating all the HMS fishery data to a centralized NMFS Oracle database.
- We are evaluating the consolidation of the HMS fishery-independent data (FY14).
- We have added the acoustic and trawl data from historic and current surveys to CalCOFI data housed in SWFSC ERDDAP (FY14).
- We continue to improve the quality and accessibility of fishery-dependent data through the annual CalCOFI meetings, the Trinational Sardine Forum, the U.S.-Mexico Bilateral meetings, the ISC, and the annual Tuna Conference.
- Resources permitting, the Billfish Angler Survey and Tagging Program data will be migrated to an online system to which anglers can enter data directly.
- Moving the western and central Pacific Ocean (WCPO) purse seine fishery data management to the Pacific Islands (FY14).

Panel recommendations and responses

Hire additional staff for both the HMS and CPS programs specifically in QA/QC, database design, data extraction and statistics (HMS)

- New restructuring and staffing during FY14-15 will decide whether to house all data managers in a common group with common and documented data management and data extraction protocols.

Prioritize the HMS program's scientific responsibilities

- The nature of migratory species requires staff to work intensively with many other countries and management organizations. We recognize that HMS staff may be overcommitted in trying to meet ecosystem mandates and address more scientific studies at the expense of adequately maintaining the time-series data needed for assessments. The Center is assessing HMS data management strategies.

Panel recommendations and responses

Examine whether the frequency of CPS assessments is optimal and develop an adaptive plan for providing the data to conduct the proper suite of CPS assessments on an appropriate schedule

- Continue working with the PFMC to prioritize assessments and enhance the number of stocks assessed
- Develop an adaptive plan for determining what data collections would best address the proposed revised CPS assessment schedule that incorporates the R/V *Lasker* and the Ocean Technology Development Tank
- Consider establishing a standing body including leadership of the SW and NW Fisheries Science Centers, the West Coast Region, the PFMC, and the PSMFC to discuss strategic priorities on a yearly basis. (Also: SaKe CIE review)
- CPS Stock identification and assessments of multiple species:
 - Develop protocols to use the *Reuben Lasker's* scientific scanning sonar
 - Developing towed optical devices to better investigate biases
 - Better define the frequency-dependent target strengths of animals of various species

Panel recommendations and responses

Continue the extensive and existing collaborations with the Pacific Islands Fisheries Science Center (PIFSC) and enhance collaborations with Mexico, California Department of Fish and Wildlife (CDFW), and the fishing community

- Continue to participate in annual CalCOFI meetings, TriNational Sardine Forums and the U.S.-Mexico Bilateral meetings to enhance collaboration and exchanges
- Share CPS survey methods and information with colleagues from Mexico and potentially, conduct joint CPS surveys beginning in 2014.
- Continue to build relationships with research colleagues in Norway in development of acoustic capabilities. Visits have already taken place to the “Tech Tank”.
- The Center will pursue more effective use of the HMS fishing community, perhaps via Experimental Fishing Permits (EFPs), to improve knowledge of HMS fisheries.
- Center will consider the suggestion to house more CDFW staff at its La Jolla Lab.

Terms of Reference

Stock Assessment Science Program Review

(28 July - 1 August 2014)



Purpose of Review

Reviews of science programs at the National Marine Fisheries Service (NMFS) Science Centers (including associated laboratories) and the Office of Science and Technology (ST) are conducted annually to:

- Evaluate the quality, relevance, and performance of science and research conducted in NMFS Science Centers and associated laboratories
- Strategically position the Science Centers and ST in planning future science and research



Octavio Aburto

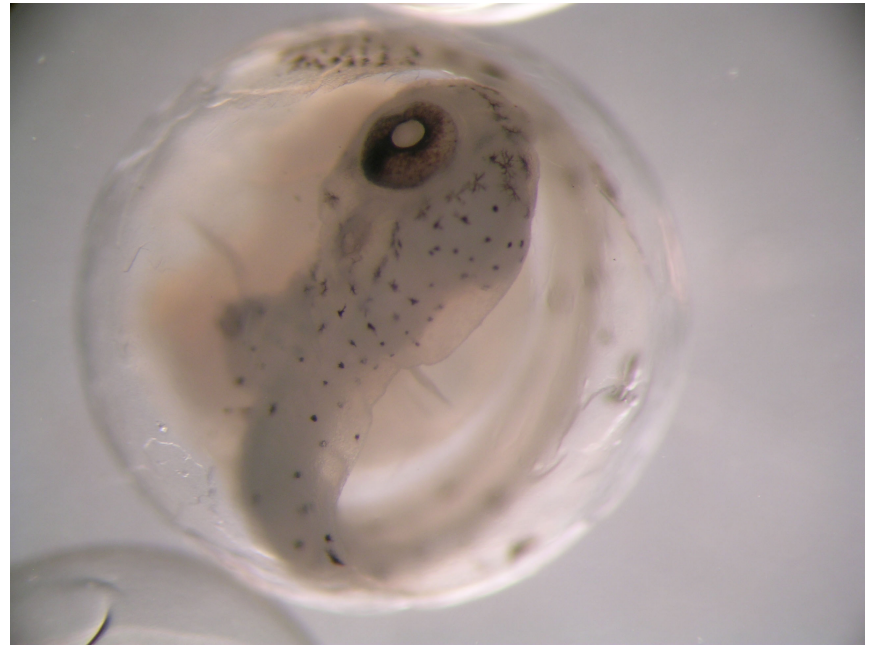


Scope of Review

Builds on 2013 review of fishery, survey and biological data.

This year's focus:

- Assessment modeling
- Assessment approach
- Review process
- Communication



Not an in-depth review of individual stock assessments

Panel requested to comment on 7 themes that define the stock assessment program:

1. Does the Center **apply a suitable scientific/technical approach** to fishery stock assessment modeling?
2. Is the **assessment process efficient, effective and clearly described**, including terms of reference for assessment reports?
3. Does the Center, in conjunction with other entities such as the Council's Scientific and Statistical Committee (SSC), have **an adequate peer review process**?
4. Is the Center's program **organization effective at accomplishing needed assessments** according to a set of assessment priorities? Include program structure, staffing, and funding; include prioritization of stocks for assessment.

Panel requests to comment on 7 themes... continued:

5. Does the Center **achieve adequate assessment accomplishments** relative to mandates particularly with respect to the number of Fishery Management Plan (FMP) species assessed?
6. Does the assessment program **adequately communicate their results, needs, and research**?
7. Are there **opportunities for improving stock assessments** and the stock assessment process?

Agenda at a glance

Monday 9:00am-3:30pm

- Welcome and Introduction
- **Theme II: Overview of Assessment Process:** Is the assessment process efficient, effective and clearly described, including terms of reference for assessment reports?
- Public comment

Tuesday 9:00am-3:30pm

- **Theme I: Scientific and Technical Process:** Does the Center apply a suitable scientific/technical approach to fishery stock assessment modeling?
- **Theme III: Peer Review Process:** Does the Center, in conjunction with other entities such as the Council's Scientific and Statistical Committee (SSC), have an adequate peer review process?
- Public comment

Wednesday 9:00am-3:30pm

- **Theme IV: Organization and Priorities:** Is the Center's program organization effective at accomplishing needed assessments according to a set of assessment priorities? Include program structure, staffing, funding; prioritization of stocks for assessment.
- **Theme V: Accomplishments Relative to Mandates:** Does the Center achieve adequate assessment accomplishments relative to mandates particularly with respect to the number of Fishery Management Plan (FMP) species assessed?
- **Theme VI: Communications:** Does the assessment program adequately communicate its results, needs, and research?
- **Theme VII: Opportunities:** Are there opportunities for improving stock assessments and the stock assessment process?
- Public comment

Thursday: Panel meets with individuals for follow-up questions as needed, and meets in private to write report

Friday: Panel report-out with Center Leadership. Private.

Report and Report-out

- Individual reports from each member of the panel
- Chair provides a summary report
- Draft reports by end of the week, a week or so to polish
- Friday mid-morning report-out by panel
- Center provides response and submits to HQ (one month/six weeks)
- Final reports and Center responses posted publicly in ~3 months

Wrap-up

*Are we doing the
right things?*



We look forward to your advice on improving the quality, relevance and performance of the SWFSC assessments.

Thank you!